

ABSTRAK

Mahfud, Rania Arif. 2014. Efek Asam Alfa Lipoat terhadap Stres Oksidatif pada Otak Tikus Wistar Jantan Model Diabetes Mellitus Tipe 1 Induksi Streptozotocin. Tugas Akhir, Program Studi Farmasi Fakultas Kedokteran Universitas Brawijaya. Pembimbing: (1) Dra. Diana Lyrawati, Apt., M.S., Ph.D. (2) dr. Imam Sarwono, Sp.PA.

Diabetes neuropaty merupakan kondisi yang dapat mempengaruhi sel pyramidal dan sel neuron di hippocampus. Asam alfa lipoat efektif terhadap kondisi patologis yang disebabkan oleh ROS (*Reactive Oxygen Species*), termasuk pada otak. Penelitian ini bertujuan untuk menginvestigasi efek ALA terhadap stres oksidatif pada otak tikus Wistar jantan yang diinduksi diabetes mellitus. Rancangan penelitian *True experimental design* dan *Posttest Only Control Group* digunakan dalam penelitian ini. Tiga puluh ekor tikus (*Rattus norvegicus* galur wistar) dibagi menjadi lima kelompok secara acak yaitu: tikus normal tanpa perlakuan ALA (NTA), DM tanpa perlakuan ALA (DTA), tikus diabetes dengan ALA dosis 80 mg (DA80), dosis 200mg (DA200), dan dosis 500 mg/kg/hari (DA500). Pemberian terapi ALA pada tikus dilakukan secara peroral sekali dalam sehari. Induksi diabetes pada tikus dilakukan intraperitoneal dosis tunggal streptozotocin 60 mg/kg berat badan. Kadar malondialdehid (MDA) pada otak diukur melalui metode spektrofotometri. Struktur otak (sel pyramidal di hippocampus) diuji setelah diwarnai dengan hematoksilin dan eosin. Kadar MDA pada DTA, DA80 dan DA200 lebih besar daripada kadar MDA pada kelompok NTA, namun tidak signifikan secara statistic pada kadar MDA yakni memiliki nilai ($p=0,260$). Uji korelasi *Pearson-Product Moment* menunjukkan hubungan positif yang lemah dan tidak signifikan ($r = 0,327$) antara kelompok NTA, DA80, dan DA200 dengan kadar MDA. Rasio berat otak terhadap berat badan tidak berbeda signifikan antara NTA, DTA, DA80, DA200 dan DA500 ($p = 0,094$) Tidak ada perbedaan struktur sel pyramidal yang berarti diantara NTA dan DTA. Kesimpulan dari penelitian ini, pemberian ALA selama 4 minggu belum menurunkan stres oksidatif pada otak tikus diabetes.

Kata kunci: diabetes mellitus tipe 1, asam alfa lipoat, malondialdehid, rasio berat otak, sel pyramidal, hippocampus, diabetes neuropaty

ABSTRACT

Mahfud, Rania Arif. 2014. Effect of Alpha Lipoic Acid on Oxidative Stress in Brain of Male Wistar Rats with Type 1 Diabetes Mellitus Model Induced by Streptozotocin. Final Assignment, Pharmacy Program, Faculty of Medicine, Brawijaya University. Supervisors: (1) Dra. Diana Lyrawati, Apt., M.S., Ph.D. (2) dr. Imam Sarwono, Sp.PA.

Diabetic neuropathy is a condition that can affect pyramidal cells and neuronal cells in the hippocampus. Alpha lipoic acid is effective in pathological conditions where ROS (Reactive Oxygen Species) have been implicated, include in brain. This study was undertaken to investigate effects of ALA on oxidative stress in diabetic brain of male Wistar rats. True experimental design and Posttest Only Control Group are used in this study. Thirty male rats were randomly divided into 5 groups: normal rats without ALA (NTA), diabetic rats without ALA (DTA), diabetic rats with ALA 80 mg (DA80), ALA dose 200 mg (DA200), and ALA dose 500 mg/kg/day (DA500). ALA therapy in mice conducted orally once a day. Diabetes was induced in rats by single intraperitoneal injection of streptozotocin (STZ) at 60 mg/kg body weight. The content of malondialdehyde (MDA) in the brain was measured by spectrophotometric assays. Brain structure (pyramidal cell in hippocampus) was assessed by staining with hematoxylin and eosin. MDA levels in the DTA, DA80 and DA200 is greater than the levels of MDA in the NTA group, but not statistically significant at the MDA values ($p = 0,260$). Test-Product Moment Pearson correlation showed a weak positive relationship and not significant ($r = 0,327$) between the groups of NTA, DA80 and DA200 with MDA. The ratio of brain weight did not differ significantly between the NTA, DTA, DA80, DA200 and DA500 ($p = 0,094$) No differences were significant pyramidal cell structure between NTA and DTA. In conclusion, the findings of the present experimental study indicate that treatment for 4 weeks with ALA had not reduced oxidative stress in diabetic brain.

Keywords: type 1 diabetes mellitus, alpha lipoic acid, malondialdehyde, brain weight ratio, Pyramidal cell, hippocampus,diabetic neuropathy.